REMARKS

Status of the Application

Prior to entry of the present Amendment, claims 1-10, 12-30, 32-39, 41-43 and 46 were all the claims pending in the Application. After entry of the present Amendment, claims 1-4, 6-10, 12-17, 20-29, 32, 34-43 and 47 will be all the claims pending in the Application.

Claims 1-10, 12-30, 32-39, 41-43 and 46 have been rejected under prior art grounds. Per the present Amendment, claims 5, 18-19, 30, 33 and 46 have been cancelled without prejudice or disclaimer, rendering their rejections moot. Claims 29, 32 and 43 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by European Application 1 006 500 to Schoenfelder et al. (hereinafter "Schoenfelder"). Claims 1-4, 6-10, 13-17, 20-26 and 41 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent (5,388,445 to Walters et al. (hereinafter "Walters") in view of U.S. Patent 6,133,839 to Ellul, Jr. et al. (hereinafter "Ellul"), in further view of U.S. Patent 6,178,827 to Feller (hereinafter "Feller"). Claim 34-39 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Schoenfelder in view of Feller. Claim 12 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Walters in view of Ellul, in further view of Feller. Claims 27, 28 and 42 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Shoenfelder in view of Walters.

Claims 41-43 have been rejected under 35 U.S.C. § 101 as allegedly being directed non-statutory subject matter.

Finally, claims 27, 29 and 33 have been objected to for alleged informalities.

No other grounds of rejection or objection have been presented. The present remarks address each ground of rejection and objection set forth by the Examiner.

Claim Objections

Claims 27, 29 and 33 have been objected to for allegedly informalities. Applicant respectfully traverses this objection. Nevertheless, Applicant has amended claims 27 and 29, and claim 33 has been cancelled without prejudice or disclaimer. Applicant respectfully requests that the objection be withdrawn.

Claim Rejections Under 35 U.S.C. § 101

Claims 41-43 have been rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. Applicant respectfully traverses the rejections. Nevertheless, Applicant has amended the claims as set forth above. Accordingly, Applicant respectfully requests that the rejections be withdrawn.

Claim Rejections Under 35 U.S.C. § 102(b)

Claims 29, 32 and 43 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Schoenfelder. Applicant respectfully traverses the rejections for the following reasons.

As currently amended, claims 29, 32 and 43 all depend from claim 27. In setting forth the rejection of claim 27, the Examiner concedes that Schoenfelder fails to disclose *at least*:

s = speed of air through the detector system such that s is given by;

$$s = \frac{d}{2}\left(\frac{1}{t_2} - \frac{1}{t_1}\right)$$

Given that claims 29, 32 and 43 now include the above recitations of claim 27, Applicant respectfully submits that claims 29, 32 and 43 distinguish over Schenfelder for *at least* this reasons. Applicant further submits that claims 29, 32 and 43 will be shown to distinguish over all the cited art for the reasons set forth below with respect to the § 103 rejections.

Claim Rejections Under 35 U.S.C. § 103(a)

Independent Claims 1 and 14

Claims 1 and 14 are the independent claims pending in the Application. Claims 1 and 14 have been rejected under §103(a) as allegedly being unpatentable over Walters in view of Ellul, in further view of Feller. Applicant respectfully traverses the rejections for the following reasons.

Claim 1 recites, *inter alia*:

> at a signal transducer of the transmitter, generating a first ultrasonic signal comprising a plurality of cycles of a characteristic waveform feature;
> at the signal transducer of the transmitter, generating a second ultrasonic signal comprising a plurality of cycles of the

characteristic waveform feature and further comprising a waveform modification being a phase shift in the cycle of a characteristic waveform feature introduced at a predetermined point in time of a duration of the second ultrasonic signal;

receiving said first and second generated signals at the receiver;

determining a time of reception of the introduced phase shift in the second ultrasonic signal by comparing the waveform of the first received signal to the waveform of the second ultrasonic signals and determining a point of diversion between corresponding characteristic waveform features of the first and second received signals ;

determining a time of flight of the second ultrasonic signal based on the determined time of reception of the introduced phase shift and its time of generation.

Applicant respectfully submits that the combination of Walters, Ellul and Feller fails to disclose *at least* the above-recited features of claim 1.

For example, in setting forth the rejection, the Examiner alleges that the recited first and second signals are disclosed through the disclosure in Walters of "a pressure wavefront traveling through fluid in the pipeline," and "determining at a given position on a pipeline a time of arrival of a pressure wave from traveling through fluid in the pipe." (Office Action, page 5, lines 10-17). Applicant respectfully disagrees for the following reasons.

First, Applicant notes that Walters does not disclose ultrasonic signals. Furthermore, the system described in Walters could only be sensitive to signals having a frequency **less than 500Hz** because it taught to be operating at a maximum sampling frequency of 1000Hz. (Walters, col. 11, line 68). In fact, some versions of the system of Walters would only be sensitive to frequencies less than 50Hz (i.e. half the sampling frequency of 100Hz). (Walters, col. 11, line 68).

Additionally, Applicant notes that the alleged signals in Walters do not possess a "characteristic waveform feature," much less "a plurality of cycles of a characteristic waveform feature." In contrast to the recitations of claim 1, the pressure signals in the pipe in Walters are comprised of random pressure noise. (Walters, col. 1, line 35, FIG. 3, and col. 9, line :25; see also "Reference Line" in FIG. 7). By definition, this pressure noise does not have a "a plurality of cycles of a characteristic waveform feature;" instead it will have an unknown and random noise.

Applicant also respectfully submits that Walters does not emit any "second signal", nor does any second signal exist which has "at least one characteristic waveform feature". Similar arguments apply to those presented above in relation to the first signal.

Applicant further submits that Walters fails to disclose the "generating a second ultrasonic signal comprising … a waveform modification being a phase shift in the cycle of a characteristic waveform feature introduced at a predetermined point in time of a duration of the second ultrasonic signal." For example, in setting forth the rejection, the Examiner alleges that arrival of the pressure wave corresponds to the recited characteristic waveform feature. (*See* Office Action, paragraph bridging pages 5 and 6). Yet, this pressure wave is clearly not a "a phase shift in the cycle of a characteristic waveform feature." As discussed above, Walters fails to disclose the recited "plurality of cycles," and therefore, cannot possibly disclose "a phase shift in the cycle of a characterisitic waveform feature." But, more importantly, the arrival of the pressure wave is clearly not "a phase shift." Instead, Walters clearly describes the arrival of the pressure wave as a change in slope, as conceded by the Examiner on page 7, lines 11-14 of the currently outstanding Office Action. Accordingly, Walters fails to disclose the recited second ultrasonic signal.

Furthermore, as Walters fails to disclose the recited "phase shift in the cycle of a characteristic waveform feature," Walters cannot possibly disclose "determining a time of reception of the introduced phase shift in the second ultrasonic signal," and "determining a time of flight of the second ultrasonic signal based on the determined time of reception of the introduced phase shift and its time of generation."

Applicant further submits that Feller and Ellul fail to remedy these deficiencies in Walters. First, while Ellul makes use of ultrasonic signals, these signals are not used to calculate a time of flight, but are instead used to communicate between physically separate smoke detectors. Furthermore, Ellul fails to disclose *at least* the recited "phase shift," the recited "determining a time of reception of the introduced phase shift," and the recited "determining a time of flight of the second ultrasonic signal." Additionally, while Feller, also makes use of ultrasonic signals, the reference fails to disclose *at least* the recited, "the introduced phase shift in the second ultrasonic signal," the recited "comparing the waveform of the first received signal to the waveform of the second ultrasonic signals and determining a point of diversion between

corresponding characteristic waveform features of the first and second received signals," and the recited, "determining a time of flight of the second ultrasonic signal based on the determined time of reception of the introduced phase shift and its time of generation."

Accordingly, Applicant respectfully submits that claim 1 patentably distinguishes over the cited art for *at least* the reasons set forth above. Applicant further submits that claim 14 patentably distinguishes over the cited art for reasons analogous to those presented with regards to claim 1.

Applicant further submits that claims 2-4, 6-10, 13, 15-17, 20-26 and 41 patentably distinguish over the cited art due *at least* to their respective dependencies on claims 1 and 14, as well as their additionally recited features.

Claim 12

Claim 12 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the art as applied to claims 1 and 14, in further view of Hill. Applicant respectfully submits that Hill fails to remedy the above-described deficiencies in Walters, Feller and Ellul, and therefore, claim 12 patentably distinguishes over the cited art due *at least* to its dependence on claim 1, as well as its additionally recited features.

Claim 27, 28 and 42

Claim 27 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Schoenfelder in view of Walters. Applicant respectfully traverses the rejection for the following reasons.

Claim 27 recites, *inter alia*:

> the transit time (t_1) being measured using a method as claimed in claim 1;
>
> ...
>
> the transit time (t_2) being measured using a method as claimed in claim 1

Accordingly, claim 27 includes all the recitations of claim 1. Applicant respectfully submits that Schoenfelder fails to disclose *at least* the features of claim 1 discussed above, and therefore, claim 27 patentably distinguishes over the cited art.

For example, in setting forth the rejection, the Examiner concedes that Schoenfelder fails to disclose the use of transducers, ultrasonic signals and transit times in determining flow via its flow sensor. Instead, Schoenfelder discloses sensing flow through the use of thermistors. (Schoenfelder, ¶ [0042]). Furthermore, Applicant submits that Walters fails to remedy these deficiencies in Schoenfelder for *at least* the reasons set forth above with regards to claim 1. Accordingly, Applicant respectfully submits that claim 27 patentably distinguishes over the cited art.

Applicant further submits that claims 28, 29, 32, 42 and 43 patentably distinguish over the cited art due *at least* to their dependence on claim 27, as well as their additionally recited features.

Claims 34-39

Claim 34-39 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Schoenfelder in view of Feller. Claims 34-39 depend from claim 27, and therefore, also depend from claim 1. Accordingly, Applicant respectfully submits that Schoenfelder fails to disclose *at least* the features of claim 1 discussed above with regards to claim 34. Applicant further submits that claim Feller fails to remedy the above-described deficiencies in Schoenfelder for *at least* the reasons set forth above with regards to claim 1. Accordingly, Applicant respectfully submits that claims 34-39 patentably distinguish over the cited art.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/Mark J. DeBoy/

Mark J. DeBoy
Registration No. 66,983

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: April 5, 2011